

Claim 1. (Previously Presented) A semiconductor device comprising:
a semiconductor substrate;
a gate insulator formed on the substrate; and
a gate electrode having a metallic compound film, the gate electrode being formed on the insulator,
wherein: the metallic compound film in the gate electrode is formed by CVD using a material containing a metal carbonyl, and at least one of a Si-containing material and a N-containing material;
the metallic compound film contains the metal in the metal carbonyl and at least one of Si and N; and
the work function of the metallic compound film can be controlled by changing the content of at least one of Si and N in the metallic compound film.

Claim 2. (Original) The semiconductor device according to claim 1, wherein the metal constituting the metal carbonyl is selected from the group consisting of W, Ni, Co, Ru, Mo, Re, Ta, and Ti.

Claim 3. (Original) The semiconductor device according to claim 1, wherein the metal carbonyl is $W(CO)_6$.

Claim 4. (Original) The semiconductor device according to claim 1, wherein the Si-containing material is selected from the group consisting of silane, disilane, and dichlorosilane.

Claim 5. (Original) The semiconductor device according to claim 1, wherein the N-containing material is selected from the group consisting of ammonia and monomethyl hydrazine.

Claim 6. (Previously Presented) The semiconductor device according to claim 1, wherein the metallic compound film is formed by using further a C-containing material, and
the metallic compound film contains the metal in the metal carbonyl, at least one of Si and N, and C.

Claim 7. (Original) The semiconductor device according to claim 1, wherein the metallic compound film is doped with an *n*-type impurity or a *p*-type impurity.

Claim 8. (Original) The semiconductor device according to claim 1, wherein the gate electrode further comprises a silicon film formed on the metallic compound film.

Claim 9. (Previously Presented) The semiconductor device according to claim 6, wherein the C-containing material is selected from the group consisting of ethylene, allyl alcohol, formic acid, and tetrahydrofuran.

Claim 10. (Previously Presented) A semiconductor device comprising:
a semiconductor substrate;
a gate insulator formed on the substrate; and
a gate electrode formed on the insulator,
wherein: the gate electrode comprises: a metallic compound film; a barrier layer formed on the metallic compound film; and a silicon film formed on the barrier layer;
the barrier layer is formed by the use of a material containing a metal carbonyl, a N-containing material, and a C-containing material;
the barrier layer contains the metal in the metal carbonyl, N, and C;
the metallic compound film is formed by the use of a material containing a metal carbonyl, and at least one of a Si-containing material and a N-containing material;
the metallic compound film contains the metal in the metal carbonyl and at least one of Si and N; and
the work function of the metallic compound film can be controlled by changing the content of at least one of Si and N in the metallic compound film.

Claim 11. (Original) The semiconductor device according to claim 10, wherein the metal constituting the metal carbonyl is selected from the group consisting of W, Ni, Co, Ru, Mo, Re, Ta, and Ti.

Claim 12. (Original) The semiconductor device according to claim 10, wherein the metal carbonyl is $W(CO)_6$.

Claim 13. (Original) The semiconductor device according to claim 10, wherein the N-containing material is selected from the group consisting of ammonia and monomethyl hydrazine.

Claim 14. (Original) The semiconductor device according to claim 10, wherein the C-containing material is selected from the group consisting of ethylene, allyl alcohol, formic acid, and tetrahydrofuran.

Respectfully submitted,
SMITH, GAMBRELL & RUSSELL, LLP

By :



Michael A. Makuch, Reg. No. 32,263
1130 Connecticut Avenue, Suite 1130
Washington, DC 20036
Telephone: (202) 263-4300
Facsimile: (202) 263-4329

August 29, 2008